

**UPENEUS FRANCISI, A NEW GOATFISH  
(PERCIFORMES: MULLIDAE)  
FROM NORFOLK ISLAND AND NEW ZEALAND**

by

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**ABSTRACT.** - The mullid fish *Upeneus francisi* is described as a new species from Norfolk Island and New Zealand from specimens collected in the depth range of 1.5-20 m. Underwater photographs taken in the Kermadec Islands indicate its probable presence at these islands. *U. francisi* is distinct in having VII spines in the first dorsal fin, the first spine 1.6-1.75 in head, 14 (rarely 15) pectoral rays, 30-33 gill rakers, head length 3.05-3.35 in SL, barbels 1.35-1.65 in head, upper lobe of caudal fin with four narrow dark cross bars, and the lower lobe of caudal fin with a broad dusky longitudinal band, the lower edge of fin with about six small dark spots (dark markings on caudal fin dull orange in life). The closest relatives of *U. francisi* appear to be *U. bensasi* described from Japan and China which differs in having 23-27 gill rakers, a shorter head, and a longer first dorsal spine, and *U. pori* from the Red Sea which has 25-29 gill rakers, an even shorter head, and reddish spots which extend onto the lower side of the body.

**RÉSUMÉ.** - Une nouvelle espèce de Mullidé, *Upeneus francisi*, est décrite d'après des spécimens collectés dans les eaux de l'île Norfolk et de Nouvelle Zélande, à des profondeurs variant de 1,5 à 20 mètres. Des photographies sous-marines indiquent la présence de l'espèce aux îles Kermadec. *U. francisi* est caractérisé par une première nageoire dorsale à VII épines, la première d'entre elles comprise 1,6 à 1,75 fois dans la longueur de la tête, 14 rayons à la nageoire pectorale, 30-33 branchiospines, une longueur de tête comprise 3,05 à 3,35 fois dans la longueur standard, des barbillons dont la longueur est comprise 1,35 à 1,65 fois dans celle de la tête, une nageoire caudale dont le lobe supérieur porte 4 étroites barres transversales foncées et le lobe inférieur une large bande longitudinale sombre, le bord de la nageoire avec environ 6 petites taches foncées (ces taches sont orange foncé sur l'animal vivant). Les espèces les plus proches de *U. francisi* semblent être *U. bensasi*, décrit du Japon, qui en diffère par le nombre des branchiospines (23-27), la tête plus courte et la première épine dorsale plus longue, et *U. pori* de la Mer Rouge qui a 25-29 branchiospines, la tête encore plus courte et des points rougeâtres sur la partie ventrale du corps.

Key-words. - Mullidae, *Upeneus francisi*, PSE, Norfolk Island, New Zealand, New species.

Lachner (1954) revised the genus *Upeneus*, one of six genera of the goatfish family Mullidae, the most diagnostic character of which is the presence of teeth on the vomer and palatines. He recognized 10 species, one in the Atlantic and the rest from the Indo-Pacific, two of which he described as new. One of his new species, *U. oligospilus* from the Persian Gulf, has been referred to the synonymy of *U. tragula* Richardson (1846) by Kumaran and Randall in Fischer and Bianchi (1984). Lachner overlooked three valid species of the genus, *U. guttatus* (Day, 1867), *U. doriae* (Günther, 1869), *U. filifer* (Ogilby, 1910), and he mistakenly placed *U. subvittatus* (Temminck and Schlegel, 1843) in the synonymy of *U. sulphureus* Cuvier in Cuvier and Valenciennes (1829). Also, he thought *U.*

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*sundaicus* (Bleeker, 1855) would prove to be either *U. tragula* or *U. luzonius* Jordan and Seale, 1907. Thomas (1969), however, regarded it as valid. As noted by Kumaran and Randall, the species Lachner identified as *U. arge* Jordan and Evermann (1903) is a junior synonym of *U. taeniopterus* Cuvier in Cuvier and Valenciennes, 1829. Fourmanoir and Guézé (1967) named *U. mascariensis* from Réunion, Cheng and Wang (1968) described *U. quadrilineatus* from the East China Sea, and Ben-Tuvia and Golani (1989) named *U. pori* from the Red Sea. Therefore, 16 apparently valid species have been described in the genus.

Doak (1972) reported a goatfish of the genus *Upeneus* from North Island, New Zealand as a new record; he referred to it as the Bar-tailed Goatfish (*Upeneus* sp.). Russell and Ayling (1976), Ayling and Cox (1982), Francis (1988), and Paulin *et al.* (1989) identified it as *Upeneus bensasi* (Temminck and Schlegel, 1843). Francis commented that it is very rare in New Zealand waters.

The senior author, Malcolm P. Francis, and associates conducted field work at Norfolk Island in November, 1988 and found what seemed to be the same species as the New Zealand one identified as *U. bensasi* common on sand bottom adjacent to rocky reefs. It was nearly always encountered in small aggregations actively moving over the sand with its barbels flicking over and into the substratum. The fish were easily approached; underwater photographs were taken, and ten specimens, 45.4-66.5 mm SL, were collected with spear and hand nets. The identification of *U. bensasi* was accepted initially because the specimens have a first dorsal fin of VII spines (the first spine long), 14 pectoral rays, 29-30 lateral-line scales, and the general morphology and color pattern of *U. bensasi*. However, counts of the gill rakers of 8-10 + 21-24 are notably higher than those of *U. bensasi* (see Table II). Further study has revealed that these specimens represent an undescribed species.

Because of the small size of the ten Norfolk specimens, it was believed they were juveniles; much searching was undertaken to locate larger fish. However, none of significantly larger size were observed. Local diver Jack Marges was then asked if he would be alert for large specimens of this species. In February of 1991 the senior author and Francis returned to Norfolk Island for more field work on fishes. Marges had been watching for notably larger fish of this species during our absence but had seen none. It was decided that this goatfish, at least at Norfolk Island, is a small species. Five more specimens were speared on this second trip, the largest 72.2 mm SL. Subsequently, specimens from Norfolk Island misidentified as *Upeneus tragula* were found in the Australian Museum. One of 77.5 mm SL is designated as a paratype. Another from North Island, New Zealand in the National Museum of New Zealand was examined. It measures 87.6 mm SL; in spite of its poor condition we also designate it as a paratype. Underwater photographs in color by M. Fraser were taken of a goatfish in the Kermadec Islands which seems to be the same species. One of these photographs was published in black and white by Francis (1991: fig. 42). Curiously, in spite of much more fish collecting and photography at Lord Howe Island than at Norfolk Island, the species remains unknown from there.

## MATERIALS AND METHODS

The following definitions are provided for measurements taken on type specimens: Standard length (SL) is the horizontal distance from the front of the upper lip in the median line to the base of the caudal fin (end of hypural plate). Body depth is the maximum depth of the body, adjusting for any obvious malformation; body width is taken just posterior to the gill opening. Head length is the distance from the front of the upper lip in the median line to the most posterior part of the opercular membrane. Snout length is measured from the front of the upper lip to the fleshy edge of the orbit. Orbit diameter is the maximum fleshy

diameter, and interorbital width is the minimum bony width. Upper jaw length is taken from the front of the upper lip to the most posterior membranous edge of the maxilla. Barbel length is measured from the most anterior point at the base to the tip of the longest barbel, taking care that the barbels have not dried, even partially. Caudal peduncle depth is the least depth; caudal peduncle length is the horizontal distance between verticals at the rear base of the anal fin and the caudal fin base. Predorsal, preanal, and prepelvic lengths are the distances from the front of the upper lip to the origin of the first dorsal fin, anal fin, and pelvic fins, respectively. Fin spine and soft ray measurements are taken from the point they emerge from the scaled part of the body (not to their extreme bases). Caudal fin length is the horizontal distance from the base of the fin to the tip of the longest ray with the fin in normal position; caudal concavity is the horizontal distance between verticals at the tips of the shortest and longest rays.

The initial spine of the second dorsal and anal fins and the pelvic spine are weakly segmented distally in this species and other mullid fishes. Because of this, some authors prefer to regard these elements as soft rays; we treat them here as spines. Lateral-line scales are counted from behind the upper end of the gill opening (the first scale counted is centered slightly dorsal to suprascapular spine) to the base of the caudal fin. The count does not include one or two more anterior scales which are higher than the lateral-line series (these anterior scales are often lost on museum specimens); nor does it include two scales which extend posterior to the base of the caudal fin. Gill rakers are counted on the first gill arch and include all rudiments; the upper-limb count is given first; the raker at the angle is contained in the lower-limb count.

Type specimens of the new species are deposited at the following institutions: Australian Museum, Sydney (AMS); Bernice P. Bishop Museum, Honolulu (BPBM); California Academy of Sciences, San Francisco (CAS); Museum National d'Histoire Naturelle, Paris (MNHN); National Museum of New Zealand, Wellington (NMNZ); National Science Museum, Tokyo (NSMT); and U.S. National Museum of Natural History, Washington, D.C. (USNM).

Data in parentheses in the description below apply to paratypes. Proportional measurements in the text are rounded to the nearest .05. Lengths of specimens are given as standard length.

#### *UPENEUS FRANCISI* N. SP.

Figs 1 to 3; Tables I-II

*Upeneus* sp. Doak, 1972: 45, pl. 18 (Poor Knights Islands, New Zealand); Francis, 1991: 213, 218, fig. 42 (Norfolk Island and Kermadec Islands).

*Upeneus bensasi* (non Temminck and Schlegel) Russell and Ayling, 1976: 279 (Poor Knights Islands, New Zealand); Ayling and Cox, 1982: 227, fig.; Francis, 1988: 31; Paulin *et al.* 1989: 191, fig. 125.2.

*Holotype.* BPBM 34256, male, 55.5 mm, Norfolk Island (29°5'S, 167°59'E), Duncombe Bay, sand next to rock drop-off, 18 m, hand net, Malcolm P. Francis and Clare Ward, 22 Nov. 1989.

*Paratypes.* AMS IB.5364, 77.5 mm, Norfolk Island, lagoon, spear, Brian Marsh, May, 1961; NMNZ P.6142, 87.6 mm, New Zealand, North Island, Poor Knights Islands, Nursery Cove, 20 m, spear, Anthony M. Ayling, 3 July 1971; BPBM 34254, 4: 47.8-60.5 mm, same locality as holotype, spear, John E. Randall, 21 Nov. 1989; CAS 76110, 46.6 mm, NSMT-P 34740, 47.5 mm SL, MNHN 1990-133, 49.0 mm SL, NMNZ P.27184, 45.4 mm, and USNM 317286, 50.2 mm, same data as holotype; BPBM 34592, 5: 66.3-72.2 mm, Norfolk Island, lagoon, Emily Bay, east side, sand and small, isolated, algal-covered rocks, 1.5 m, spear, John E. Randall, 17 Feb. 1991.

Table 1. - Proportional measurements of type specimens of *Upeneus francisi* expressed as percentages of the standard length.

|                            | Holotype |       | Paratypes |       |        |          |        |       |         |       |       |       |
|----------------------------|----------|-------|-----------|-------|--------|----------|--------|-------|---------|-------|-------|-------|
|                            | BPBM     | 34256 | NMNZ      | CAS   | NSMT   | MNIIN    | USNM   | BPBM  | BPBM    | BPBM  | BPBM  | BPBM  |
|                            |          |       | P27184    | 76110 | P34740 | 1990-133 | 317286 | 34592 | 34592   | 34592 | 34592 | 34592 |
| Standard length (mm)       | 55,5     |       | 45,4      | 46,6  | 47,5   | 49,0     | 50,2   | 66,3  | 69,3    | 71,8  | 72,2  |       |
| Body depth                 | 21,9     |       | 22,0      | 22,1  | 23,5   | 22,5     | 23,4   | 25,7  | 25,3    | 25,3  | 25,7  |       |
| Body width                 | 12,6     |       | 12,5      | 13,1  | 13,6   | 14,3     | 12,7   | 13,8  | 13,0    | 12,8  | 12,5  |       |
| Head length                | 31,6     |       | 31,1      | 32,2  | 32,9   | 31,9     | 32,5   | 30,5  | 29,9    | 29,9  | 29,7  |       |
| Snout length               | 11,1     |       | 11,0      | 11,3  | 11,0   | 11,7     | 11,4   | 11,8  | 11,2    | 11,3  | 11,9  |       |
| Orbit diameter             | 9,4      |       | 10,3      | 10,2  | 9,7    | 9,6      | 9,6    | 7,9   | 7,8     | 7,0   | 6,9   |       |
| Interorbital width         | 7,6      |       | 7,7       | 7,7   | 8,2    | 8,1      | 8,0    | 8,0   | 7,9     | 7,7   | 7,8   |       |
| Upper jaw length           | 11,4     |       | 11,0      | 11,2  | 11,9   | 11,7     | 11,9   | 10,9  | 10,5    | 10,9  | 10,4  |       |
| Barbel length              | 19,8     |       | 20,3      | 20,0  | 21,7   | 19,6     | 19,4   | 19,3  | 19,0    | 18,2  | 18,1  |       |
| Caudal peduncle depth      | 10,0     |       | 9,4       | 10,2  | 10,2   | 10,1     | 10,3   | 10,7  | 11,0    | 11,0  | 10,6  |       |
| Caudal peduncle length     | 24,9     |       | 24,8      | 24,3  | 24,2   | 23,8     | 24,5   | 24,2  | 24,5    | 25,1  | 24,6  |       |
| Predorsal length           | 39,8     |       | 39,7      | 40,0  | 40,2   | 40,1     | 39,6   | 40,2  | 37,7    | 37,3  | 37,6  |       |
| Prenal length              | 66,3     |       | 65,6      | 64,4  | 66,4   | 65,5     | 65,0   | 64,8  | 65,7    | 64,3  | 65,5  |       |
| Prepelvic length           | 33,0     |       | 34,4      | 32,2  | 33,4   | 31,7     | 32,3   | 31,7  | 33,1    | 31,9  | 30,7  |       |
| Base of first dorsal fin   | 16,2     |       | 17,1      | 16,0  | 18,2   | 17,3     | 16,3   | 18,1  | 18,9    | 18,3  | 17,1  |       |
| Base of second dorsal fin  | 14,1     |       | 13,5      | 14,8  | 13,9   | 14,0     | 13,9   | 14,3  | damaged | 14,1  | 14,6  |       |
| Longest dorsal spine       | 18,0     |       | 17,7      | 18,2  | 19,1   | 19,3     | 18,9   | 19,2  | 18,8    | 18,5  | 18,1  |       |
| Spine of second dorsal fin | 9,0      |       | 8,4       | 8,4   | 8,6    | 9,4      | 8,4    | 9,3   | 8,7     | 8,9   | 8,7   |       |
| Longest dorsal ray         | 14,3     |       | 14,9      | 16,7  | 16,4   | 15,7     | 15,3   | 16,2  | 15,7    | 15,5  | 15,3  |       |
| Base of anal fin           | 11,7     |       | 10,9      | 11,3  | 11,8   | 11,3     | 11,1   | 12,3  | 11,2    | 11,1  | 10,8  |       |
| Anal fin spine             | 10,4     |       | 9,0       | 10,8  | 10,5   | 10,2     | 9,9    | 9,1   | 8,8     | 9,2   | 9,3   |       |
| Longest anal ray           | 14,8     |       | 16,0      | 15,0  | 14,8   | 16,2     | 15,3   | 13,8  | 13,0    | 14,0  | 13,0  |       |
| Caudal fin length          | 28,0     |       | 28,0      | 28,1  | 29,2   | 29,0     | 26,7   | 26,1  | 27,5    | 27,6  | 26,1  |       |
| Caudal concavity           | 15,4     |       | 15,3      | 15,1  | 15,3   | 14,9     | 13,3   | 13,4  | 15,1    | 14,2  | 13,8  |       |
| Pectoral fin length        | 25,2     |       | 25,6      | 25,8  | 24,6   | 25,1     | 25,5   | 21,1  | 20,3    | 20,8  | 21,2  |       |
| Pelvic spine length        | 18,0     |       | 17,6      | 17,4  | 18,5   | 17,2     | 17,5   | 16,8  | 15,8    | 16,0  | 16,6  |       |
| Pelvic fin length          | 24,5     |       | 24,1      | 23,8  | 23,5   | 23,1     | 23,4   | 21,1  | 18,4    | 20,9  | 21,4  |       |

### Diagnosis

Teeth present on jaws, vomer, and palatines (genus *Upeneus*); dorsal spines VII, the first and second longest; pectoral rays 14 (rarely 15); gill rakers 8-9 + 21-24; body depth 3.9-4.55 in SL; head length 3.05-3.35 in SL; barbels short, 1.35-1.6 in head; four narrow, diagonal, dusky bands on upper lobe of caudal fin, the last at lobe tip, and a broad, longitudinal, dusky band in lower lobe (bands dusky orange in life; may be faded on preserved specimens).

### Description

Dorsal rays VII-1,8; anal rays 1,6 (all dorsal and anal soft rays branched, the last to base); principal caudal rays 15, the median 13 branched; upper and lower procurent caudal rays 8, the posterior two or three segmented; pectoral rays 14 (one paratype with 15), the uppermost unbranched; pelvic rays 1,5; lateral-line scales 29 (29-30); scales above lateral line to origin of first dorsal fin 2; scales below lateral line to origin of anal fin 5; median predorsal scales 14; median preopercular scales 8; circumopercular scales 16; horizontal rows of scales on cheek 2 1/2; median dorsal scales between dorsal fins 3; gill rakers 8 + 22 (8-9 + 21-24); pseudobranchial filaments 16 (increasing with age, 13 in 46.6-mm paratype and 21 in 72.2-mm paratype); branchiostegal rays 3; vertebrae 10 + 14.

Body elongate, the depth 4.55 (3.9-4.55) in SL, and compressed, the width 1.75 (1.55-2.05) in depth; head length 3.15 (3.05-3.35) in SL; snout length 2.85 (2.5-3.0) in head, its dorsal profile commencing vertically above upper lip and becoming progressively less convex to interorbital space; orbit diameter 3.35 (3.0-4.3) in head; interorbital space flat, the least width 4.15 (3.8-4.2) in head; barbels short, 1.6 (1.35-1.65) in head; caudal peduncle depth 3.15 (2.7-3.3) in head; caudal peduncle length more than twice peduncle depth, 1.25 (1.2-1.35) in head.

Table II. - Gillraker counts of specimens of *Upeneus bensasi* and *U. francisi*.

|                 | Upper-limb rakers |    |   |    | Lower-limb rakers |    |    |    |    |    |    |    |    |  |
|-----------------|-------------------|----|---|----|-------------------|----|----|----|----|----|----|----|----|--|
|                 | 6                 | 7  | 8 | 9  | 16                | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 |  |
| <i>bensasi</i>  | 3                 | 25 | 1 | -  | 1                 | 5  | 10 | 10 | 3  | -  | -  | -  | -  |  |
| <i>francisi</i> | -                 | -  | 1 | 14 | -                 | -  | -  | -  | -  | 1  | 6  | 6  | 2  |  |

|                 | Total rakers |    |    |    |    |    |    |    |    |    |    |  |
|-----------------|--------------|----|----|----|----|----|----|----|----|----|----|--|
|                 | 23           | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |  |
| <i>bensasi</i>  | 1            | 6  | 9  | 11 | 2  | -  | -  | -  | -  | -  | -  |  |
| <i>francisi</i> | -            | -  | -  | -  | -  | -  | -  | 1  | 7  | 5  | 2  |  |

Mouth small, the maxilla nearly or just reaching a vertical at front edge of orbit, the upper jaw length 2.8 (2.7-2.85) in head; mouth slightly inferior and oblique, forming an angle of about 30° to the horizontal; maxilla partly hidden beneath broad preorbital, its posterior end thin and broadly rounded. Well-spaced, small, blunt, conical teeth in a single row (somewhat irregular anteriorly) in jaws, 22 counted on one side of upper jaw of 72.2-mm paratype and 22 on side of lower jaw; a V-shaped patch of small villiform teeth on vomer, and a narrow band on each palatine. Tongue fused to floor of mouth. Outer surface of lips finely papillate. Barbels densely papillate.

Anterior nostril a small, vertically oval, forward-directed opening with a low membranous posterior rim in front of ventral third of eye nearly half distance to front of snout; posterior nostril a vertical opening tightly covered by skin in front of

upper part of eye in line with bony anterior edge of orbit. Gill membranes narrowly attached to isthmus. Gill rakers long, the longest at angle on first arch clearly longer than longest gill filaments, three-fifths orbit diameter of holotype.

A single, flat, acute spine posteriorly on opercle at level of upper edge of pupil, this spine angling slightly upward; a membranous, flat, spine-like projection on edge of opercle a short distance above opercular spine; suprascapula with a small, flat, stout spine which projects posteriorly and slightly outward; margin of preopercle thin and membranous, the edge smooth.

Scales very finely ctenoid; head fully scaled except for lips, a very small zone at front of snout, another at tip of chin, and a small area containing nostrils; small scales present on spine and first two rays of second dorsal and anal fins extending about half way to fin margins (lost on most specimens; perhaps more were present posteriorly on these fins); base of caudal fin with large scales; a few small scales basally on pectoral fins; two large, rounded, midventral scales extending posteriorly from base of pelvic fins. Lateral line following contour of back; lateral-line scales with branched tubules except posteriorly, the larger specimens with as many as four branches on anterior scales.

Origin of first dorsal fin above fourth lateral-line scale; dorsal spines slender and flexible; first and second dorsal spines longest, subequal, 1.75 (1.6-1.75) in head; seventh dorsal spine about one-third length of longest spine; origin of second dorsal fin above base of fifteenth lateral-line scale; initial spine of second dorsal fin 3.5 (3.3-3.85) in head; first dorsal soft ray usually longest, 2.2 (1.9-2.1) in head; origin of anal fin below base of second dorsal soft ray; anal spine 3.05 (3.0-3.45) in head; first anal soft ray usually longest, 2.1 (1.95-2.3) in head; penultimate soft ray of second dorsal and anal fins slightly more than half length of longest ray, the last ray usually a little longer than penultimate ray; caudal fin forked, its length 3.6 (3.4-3.8) in SL; caudal concavity 2.05 (2.0-2.45) in head; fourth pectoral ray usually longest, 1.25 (1.2-1.45) in head; pelvic spine 1.75 (1.75-1.9) in head; first and second soft rays of pelvic fins longest, subequal, 1.3 (1.3-1.6) in head.

*Color of holotype in alcohol.* Pale yellowish dorsally on head and body, shading to silvery white on sides and ventrally; faint dusky markings along back following scale rows, some as circles or curved lines, others as small spots; a midlateral row of ten dark-edged spots approximately circular or ellipsoid in shape faintly visible on body (not apparent on most paratypes); four very faint, narrow, oblique, dusky cross bands on upper lobe of caudal fin, the last at lobe tip; remaining fins immaculate.

*Color of holotype when fresh.* Light lavender-gray dorsally on head and body, soon shading to silver on sides and ventrally, the uppermost four rows of scales with small orange spots and curved markings; operculum with vague orange blotches; a small orange blotch ventrally on head below eye; barbels white; iris mainly yellow, pinkish silver dorsally and ventrally; first dorsal fin with bluish white and orangish blotches forming three ill-defined curved bands of each color; second dorsal fin with three narrow white stripes and three narrow dull orange stripes formed from spots that are mainly on rays (membranes largely transparent), the orange spots outermost; anal fin transparent, the rays largely whitish with two transverse series of faint small orangish spots; upper lobe of caudal fin with four narrow, white, oblique, cross bands alternating with dull orange bands, each separated by a translucent zone (the orange lobe tip is counted as the fourth band of this color); lower lobe of caudal fin with a broad, median longitudinal, dull orange band separated on each side by a narrow translucent zone from a white outer band; lower white band interrupted at margin by a series of six dull orange spots; paired fins whitish, the pectorals with a small orange spot at upper base, the pelvics with three faint dusky cross bars.

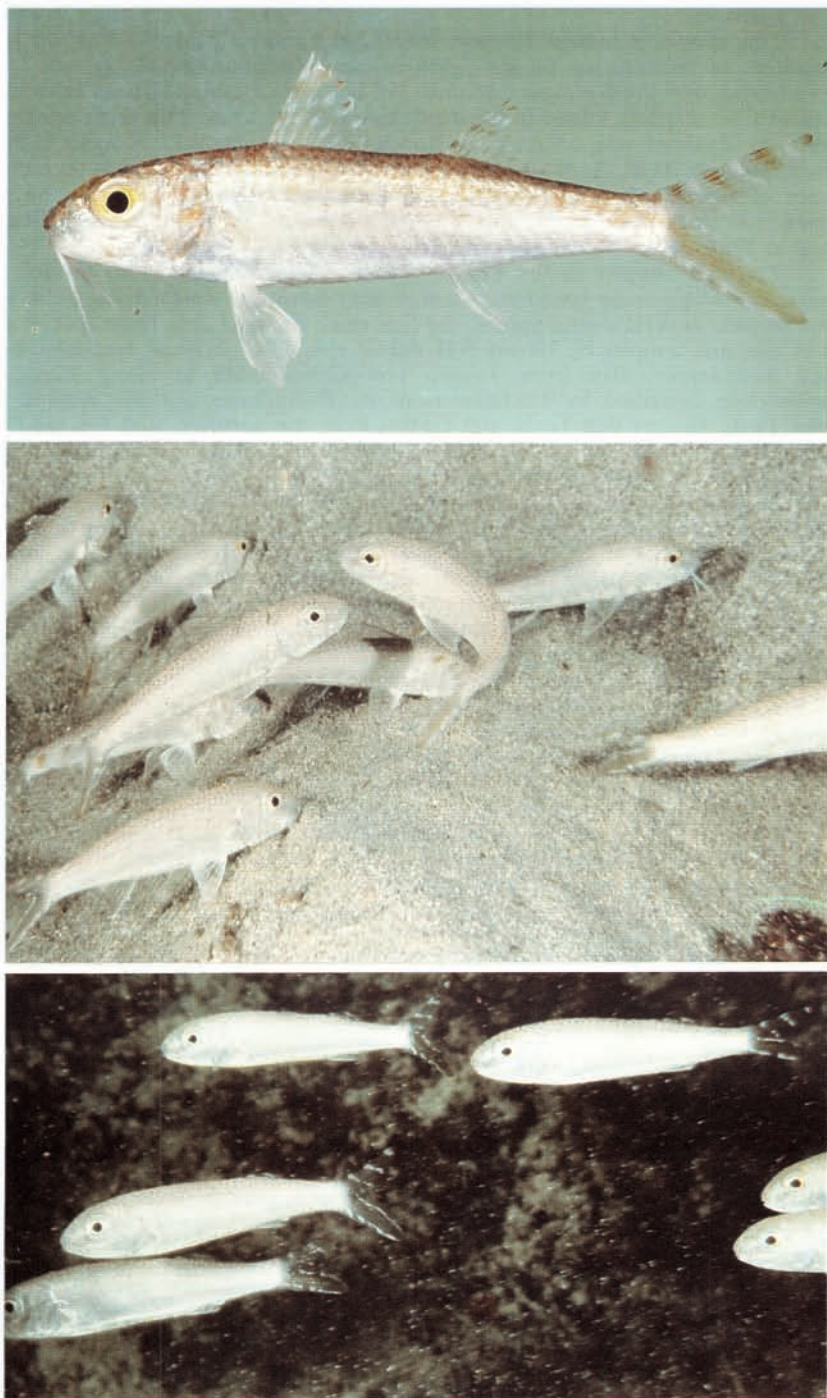


Fig. 1. - Holotype of *Upeneus francisi*, BPBM 34256, 55.5 mm SL, Norfolk Island.

Figs 2 and 3. - Underwater photographs of *Upeneus francisi*, Duncombe Bay, Norfolk Island, 18 m.

### Remarks

This species is named *Upeneus francisi* in honor of Malcolm P. Francis in recognition of his research on the fishes of New Zealand, Norfolk Island, Lord Howe Island, and the Kermadec Islands. All but one of our specimens have been collected from Norfolk Island in the depth range of 1.5-18 m. The single specimen from New Zealand was collected at Nursery Cove in the Poor Knights Islands from a depth of 20 m. As mentioned above, an underwater photograph taken of a species of *Upeneus* by M. Fraser in the Kermadec Islands appears to be this species. A small aggregation was observed regularly off Fishing Rock, Raoul Island in 1988.

The first couplet in the key to *Upeneus* by Lachner (1954) divides the species into two groups based on whether they have VII dorsal spines, the first spine longest, or VIII dorsal spines, the first spine minute. Only three species sort out in the first couplet by having VII dorsal spines, *U. bensasi* described from Japan and known also from Taiwan and China south to Hong Kong; *U. asymmetricus* described by Lachner from the Philippines; and the Atlantic *U. parvus* Poey. *U. pori* Ben-Tuvia and Golani from the northern Red Sea (and the eastern Mediterranean as a result of passage through the Suez Canal), described in 1989, also has VII dorsal spines.

*U. asymmetricus* is readily differentiated from *U. francisi* in having six or seven dark brown cross bars on the lower lobe of the caudal fin and a brown stripe on the midside of the body; also it has 27-29 gill rakers. *U. parvus* is quickly eliminated by having higher pectoral-ray and lateral-line scale counts.

*U. francisi* fits all the characters in Lachner's key for *bensasi* except the last, 23-27 gill rakers; this species is a close relative of *U. francisi*. Further comparison of *bensasi* and *francisi* revealed some differences in body and fin proportions. *U. bensasi* is slightly less elongate on the average, its depth 3.7-4.35 in SL, compared to 3.9-4.55 for *francisi*; the head length is shorter, 3.35-3.55 in SL compared to 3.05-3.35 for *francisi*; the snout is longer, 2.3-2.45 in head length, compared to 2.5-3.0 for *francisi*; the barbels are generally longer, 1.3-1.45 vs. 1.35-1.65 for *francisi*; and the first dorsal spine is longer, 1.4-1.5 in head, compared to 1.6-1.75 for *francisi*.

*Upeneus pori* is another close relative of *U. francisi*. It differs in having 25-29 gill rakers, a short head (3.4-3.9 in SL), and small reddish brown spots which extend onto the lower side of the body.

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